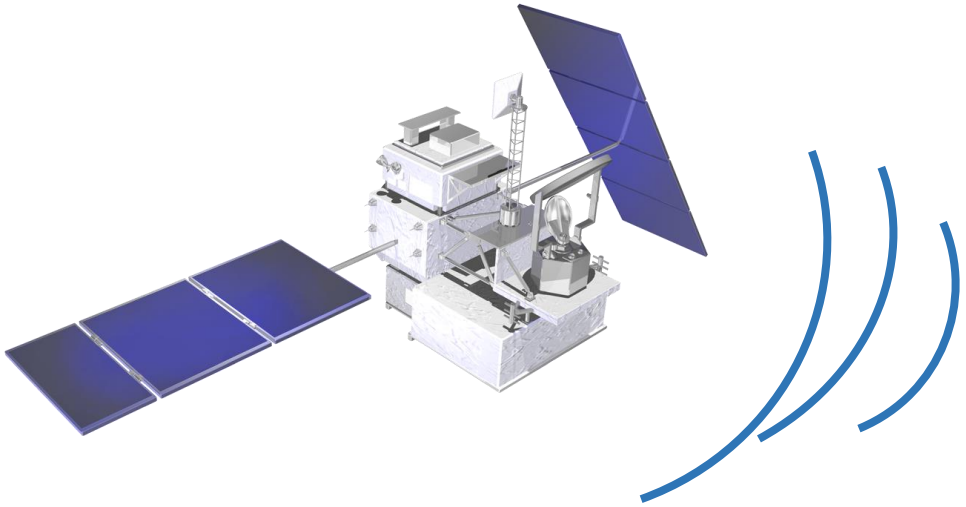
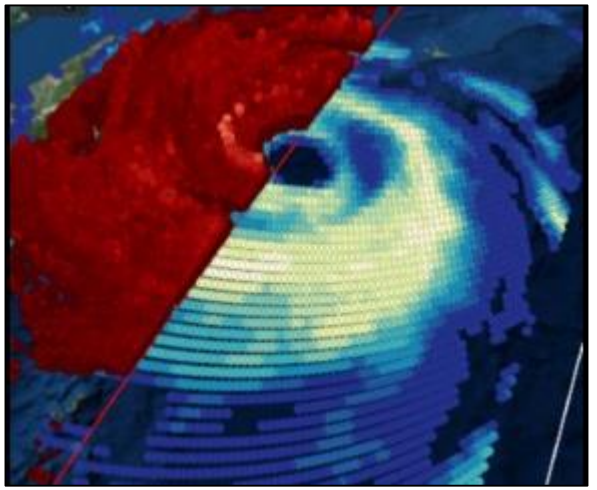
Web-Based Geospatial Visualization of GPM Data with CesiumJS





March 27, 2018

Matt Lammers (matthew.r.lammers@nasa.gov)
Senior Science Data Visualization Analyst/Software Engineer
NASA Goddard Space Flight Center / SGT, Inc.

Outline

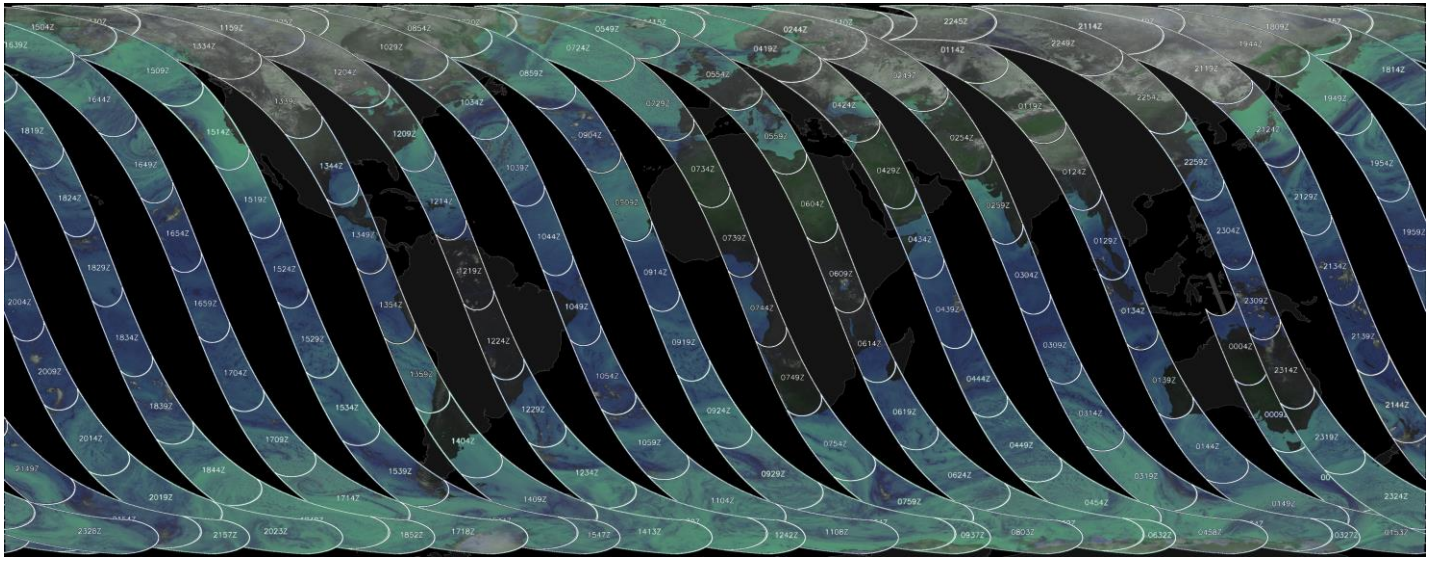
- GPM Data – What is it?

- CesiumJS – What is it? How can I use it?

- Putting the Two Together!

About GPM

- GPM: Global Precipitation Measurement Mission Core Satellite
- Contains Two Instruments: GPM Microwave Imager (GMI) and Dual-frequency Precipitation Radar (DPR)
- Orbits every ~90 minutes between ±67° Latitude



GPM Products

https://storm.pps.eosdis.nasa.gov

- Level 1: Raw Swath-Based Data
  - Counts from DPR
  - Brightness Temperature from GMI (and partner instruments)
- Level 2: Derived Swath-Based Data
  - Precipitation Variables from DPR and GMI (and partner instruments)
- Level 3: Aggregated Lat/Lon Gridded Data
  - Precipitation Variables from DPR and GMI (and partner instruments)

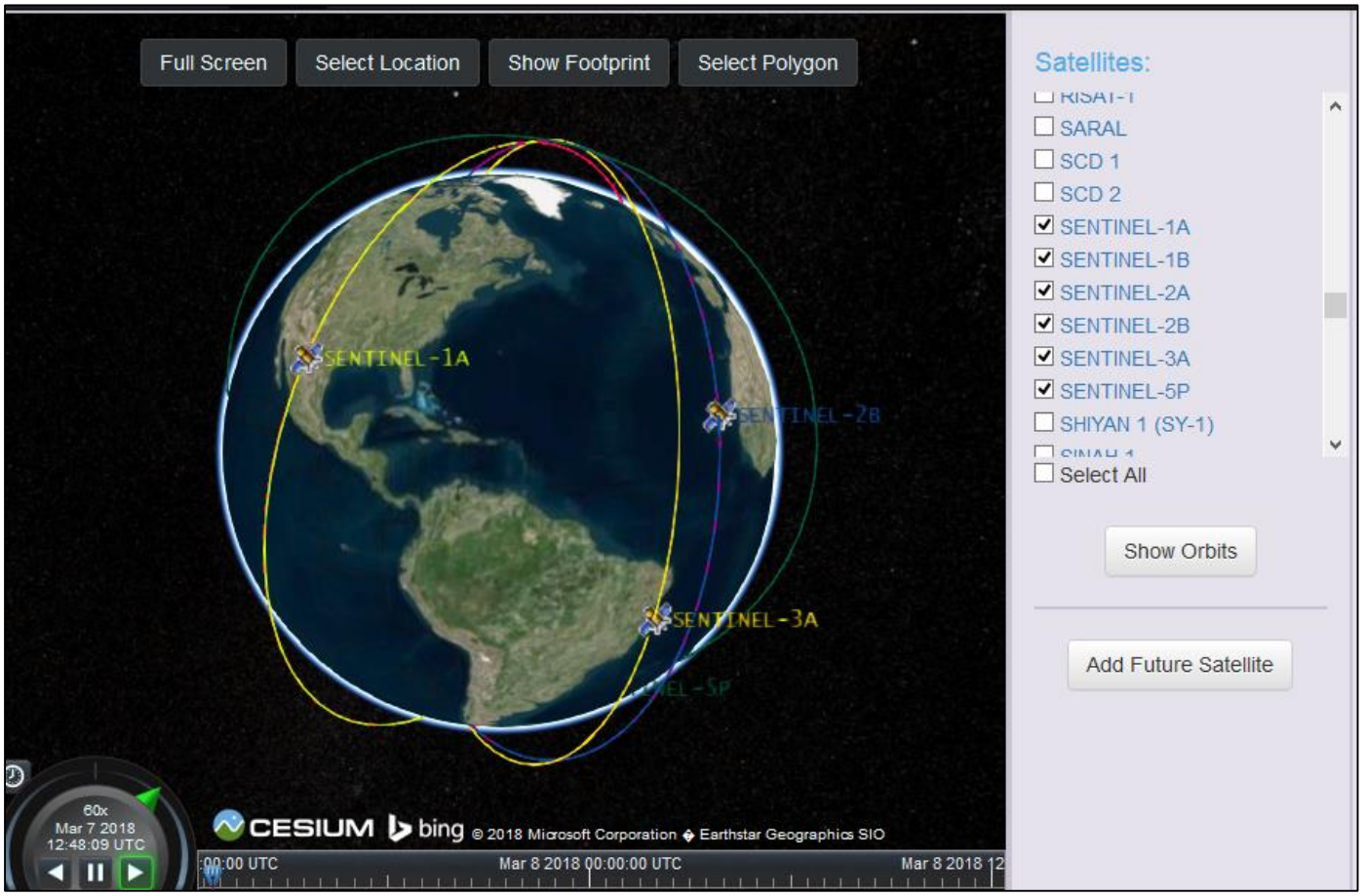
About CesiumJS

https://cesiumjs.org

- Open Source JavaScript Library for Visualizing Data On, Above, and Below the Earth's Surface
- Everything is Online
- Works with Time-Varying Data
- Moving Toward 3DTiles for Point Clouds, Vector Tiles, and 3D Shapes

CesiumJS Examples

https://cesiumjs.org/demos



CesiumJS Examples

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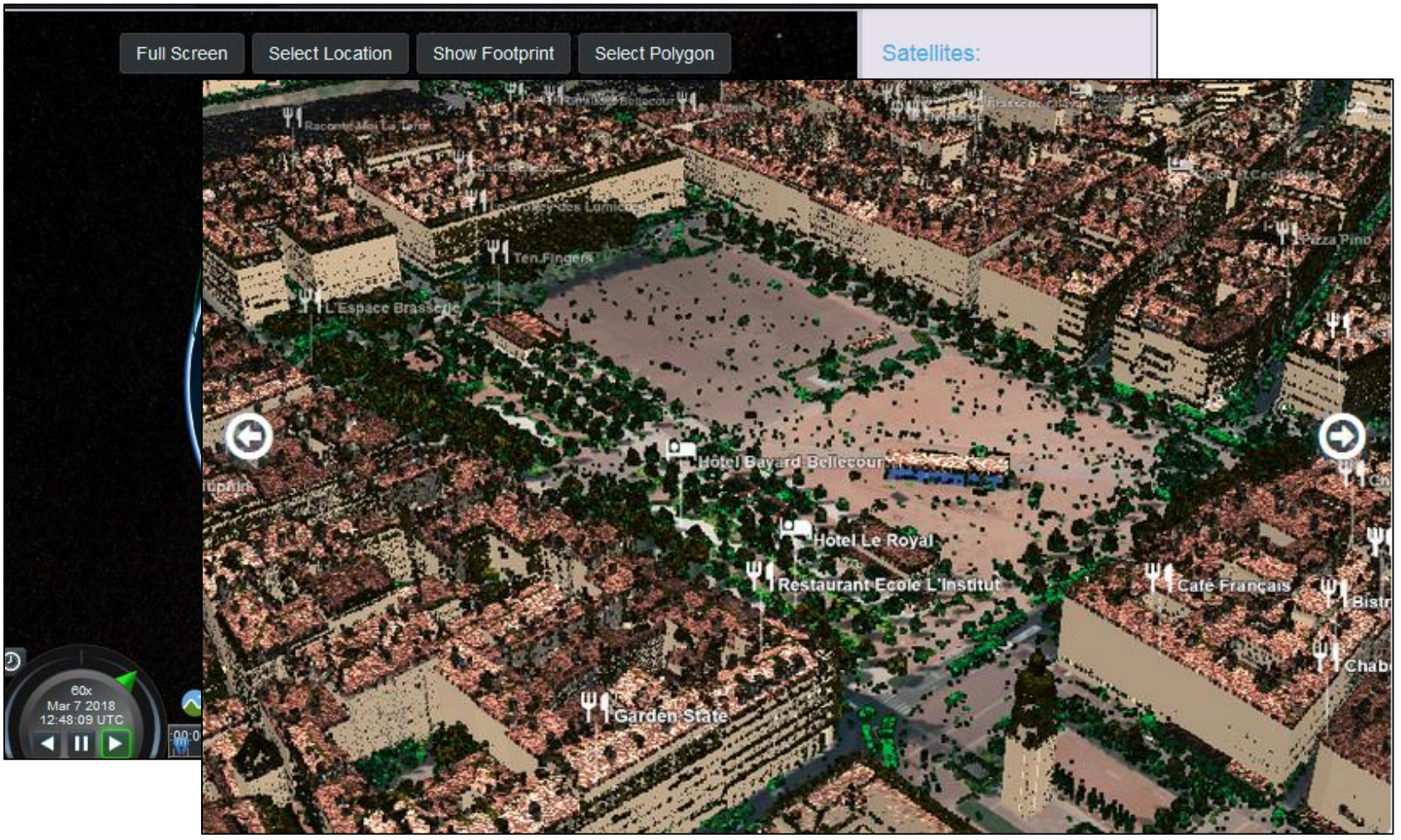

CesiumJS Examples

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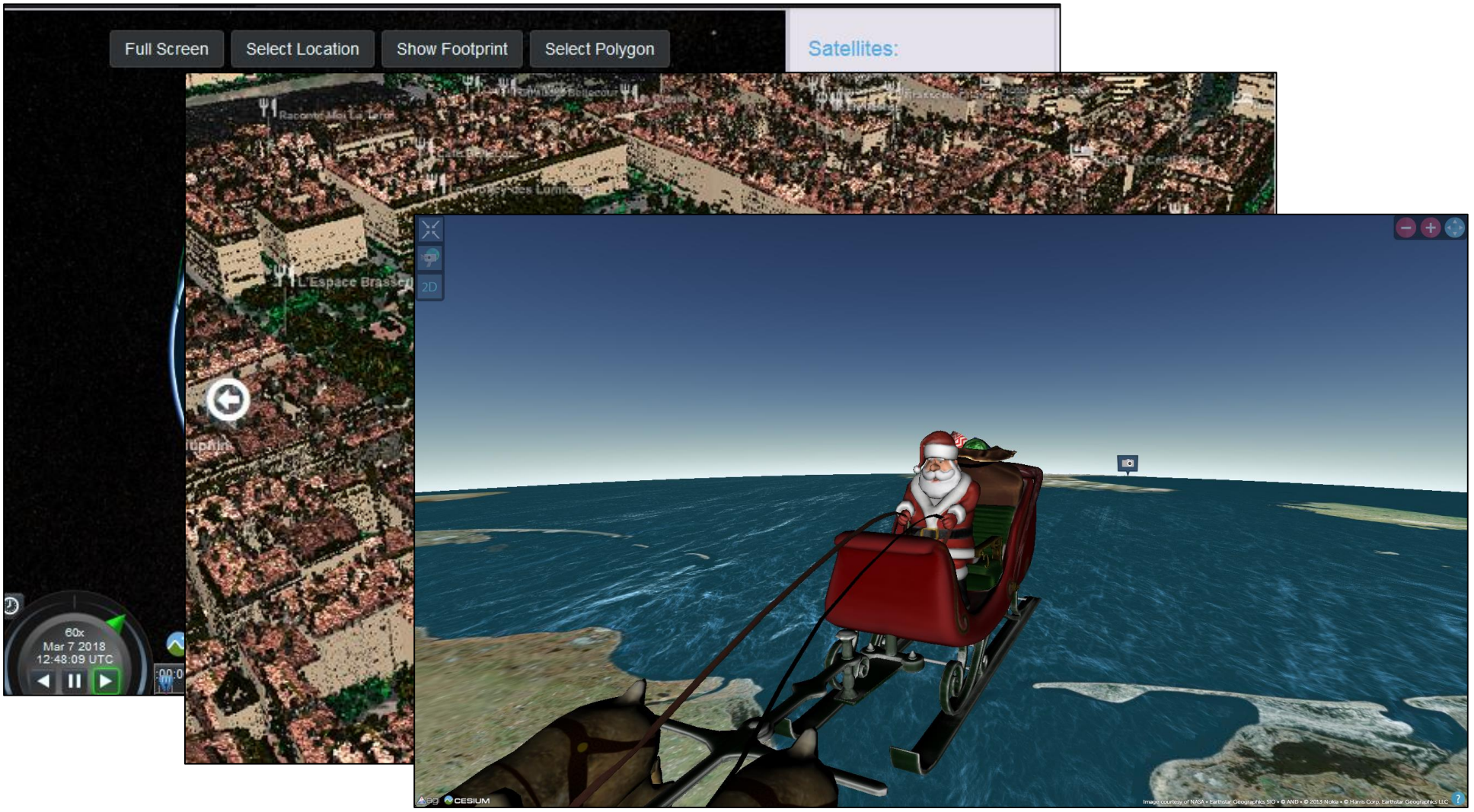
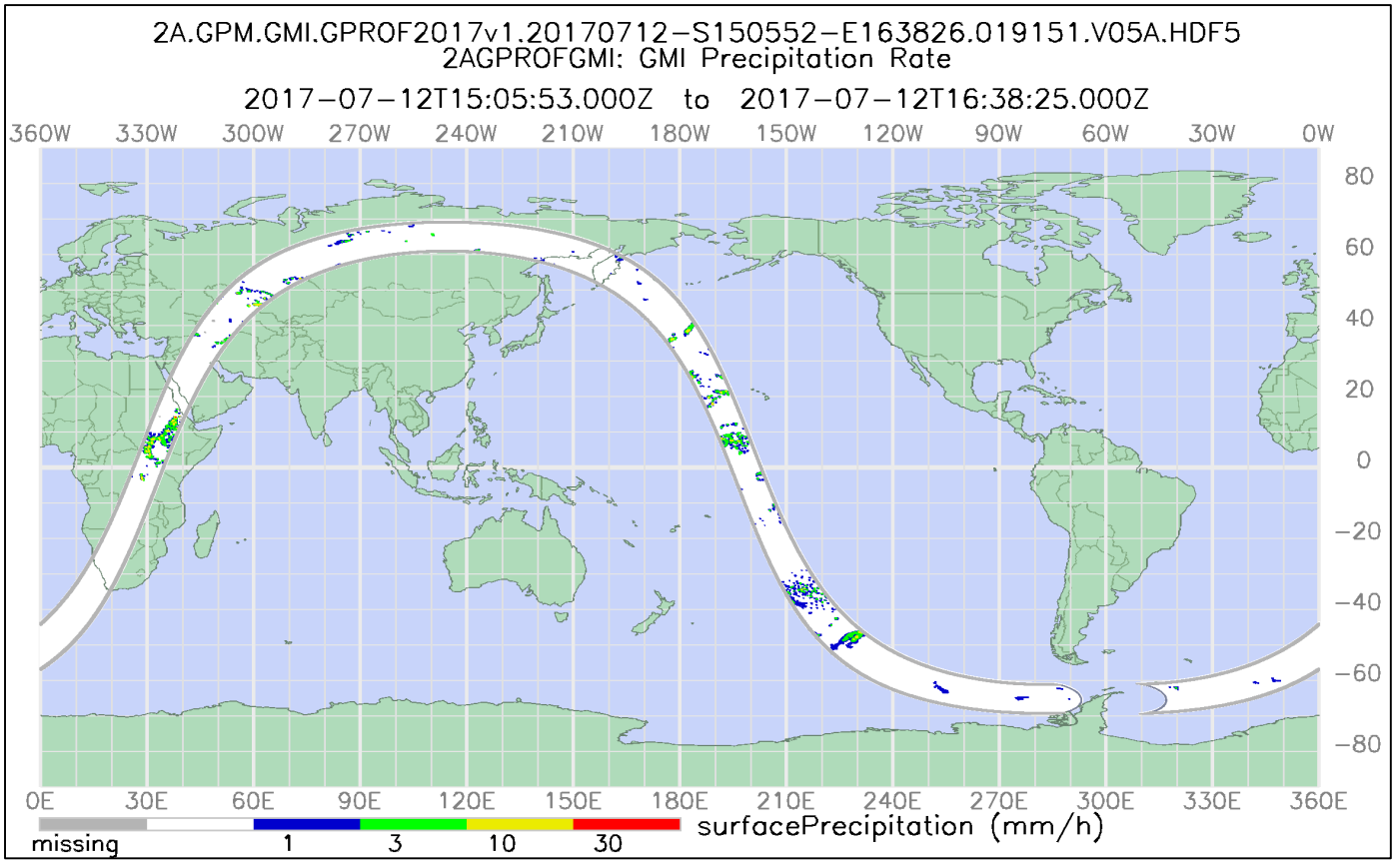


Putting Them Together

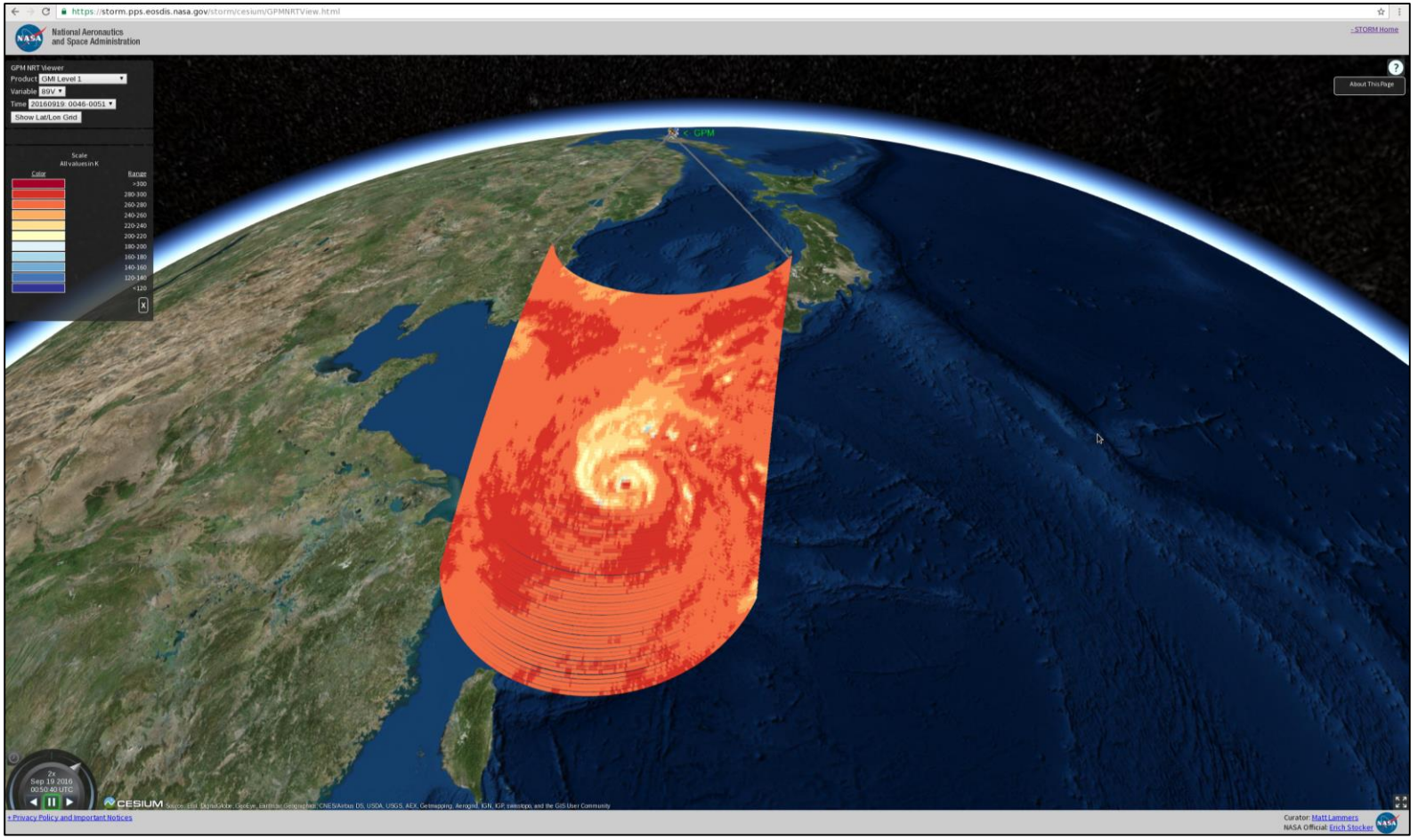
When I came to NASA, project scientists were making decisions about data acquisition based on static images.



Putting Them Together

https://storm.pps.eosdis.nasa.gov/storm/GPMNRTView.html

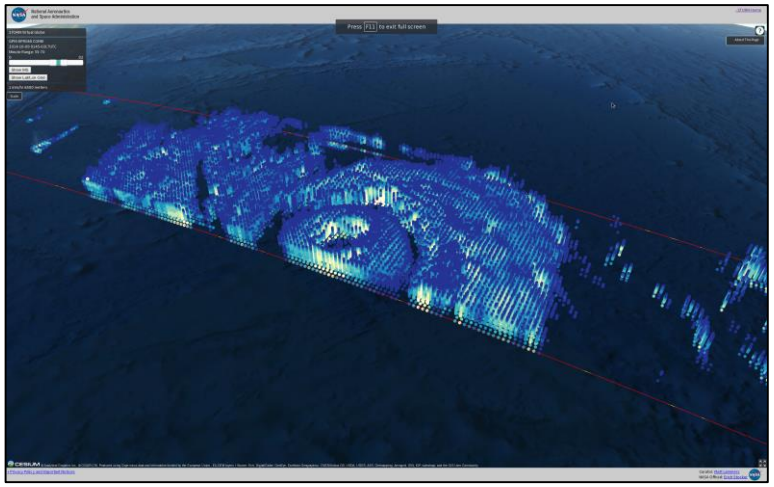
Near Real Time Viewer

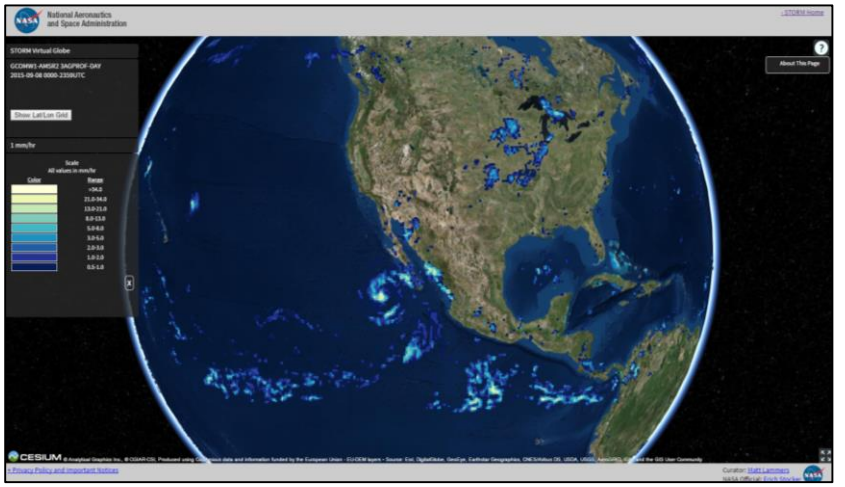


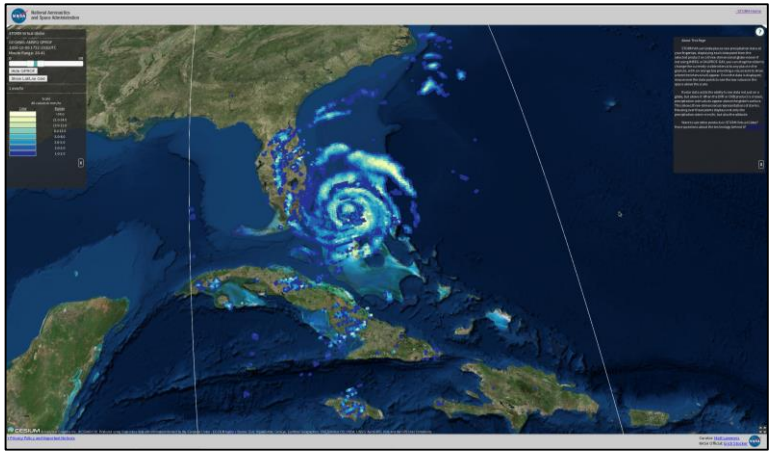
Putting Them Together

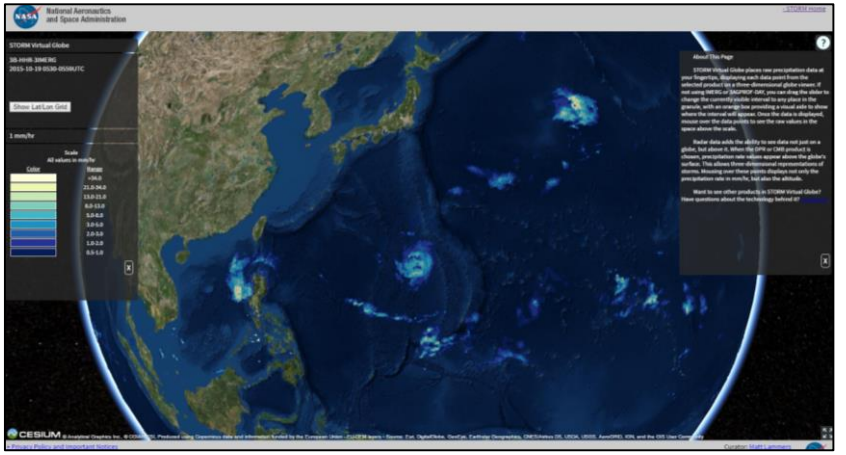
https://storm.pps.eosdis.nasa.gov/storm/Tools.jsp

Virtual Globe





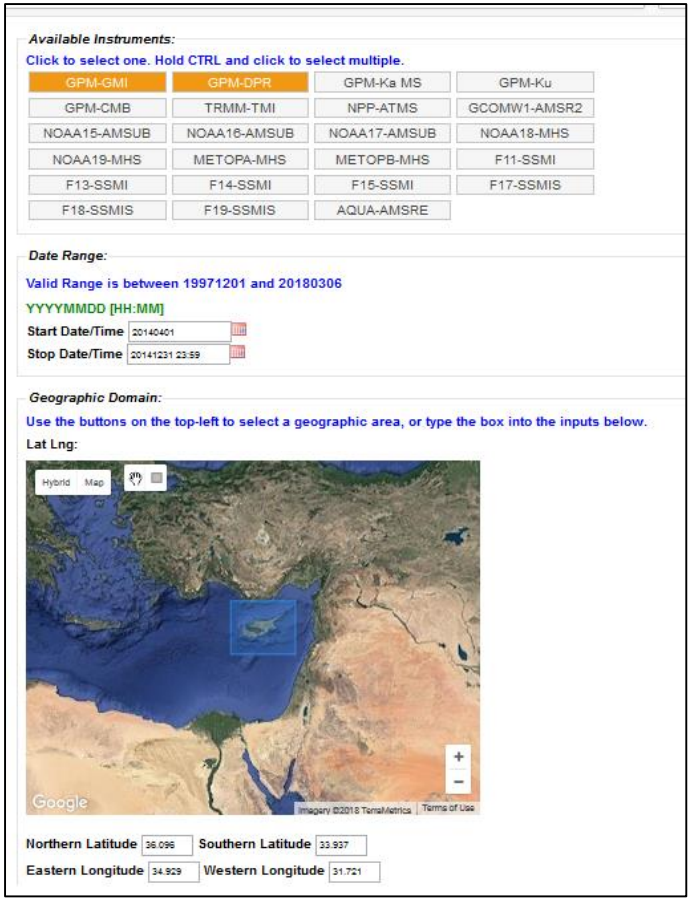




Putting Them Together

https://storm.pps.eosdis.nasa.gov/storm/Analysis.jsp

Swath-Based Analysis Tool + Virtual Globe



Putting Them Together

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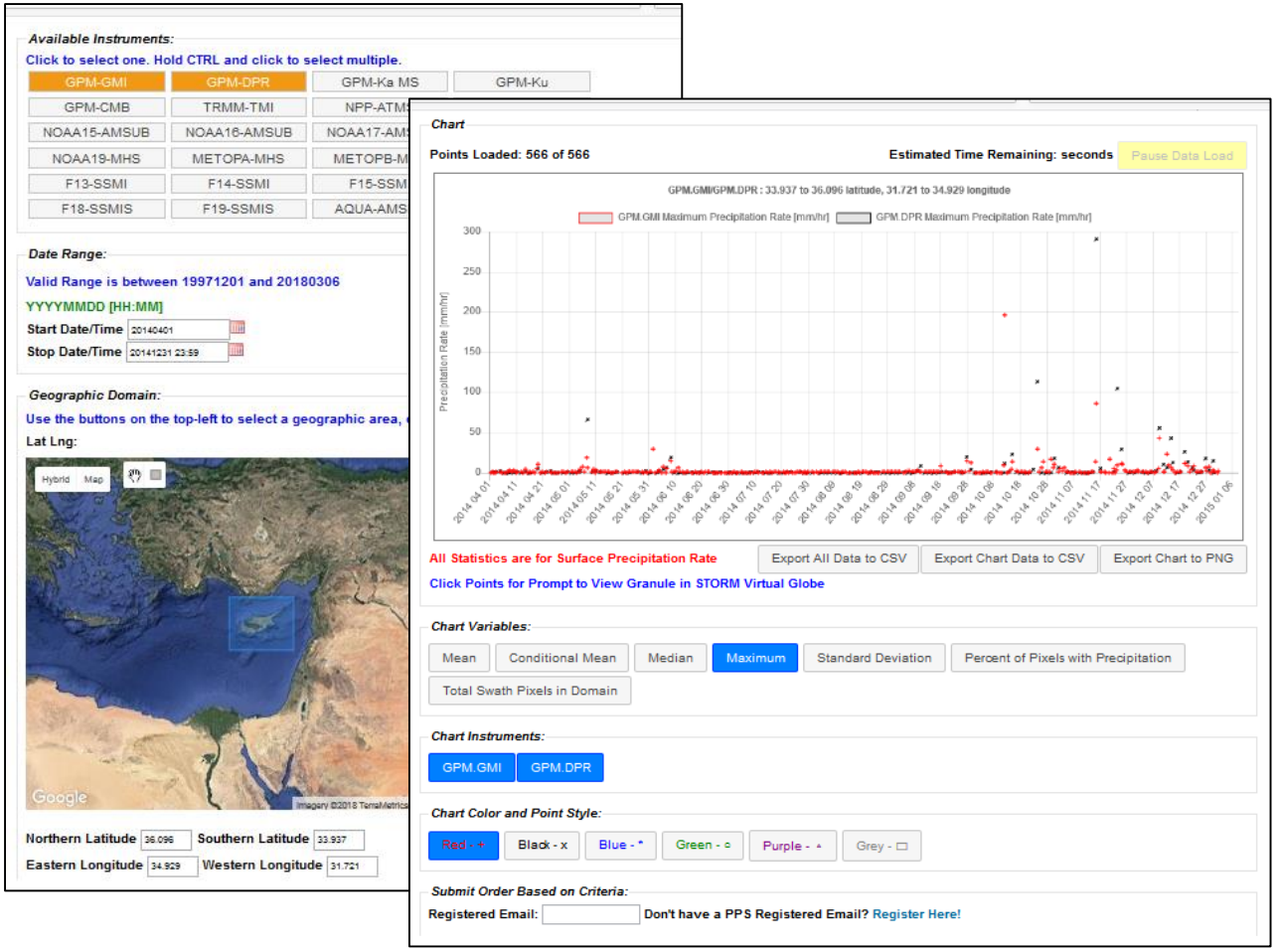

Putting Them Together

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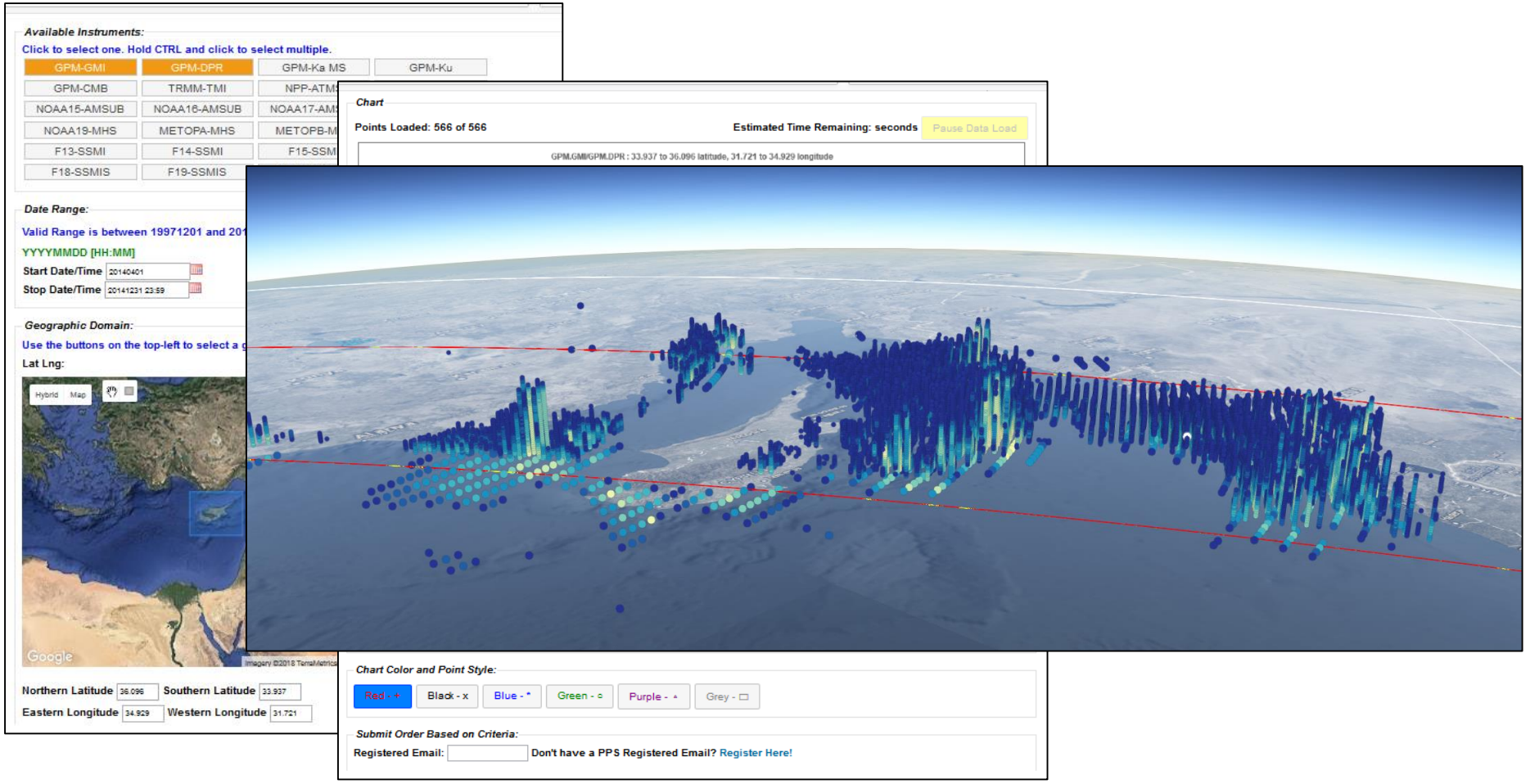
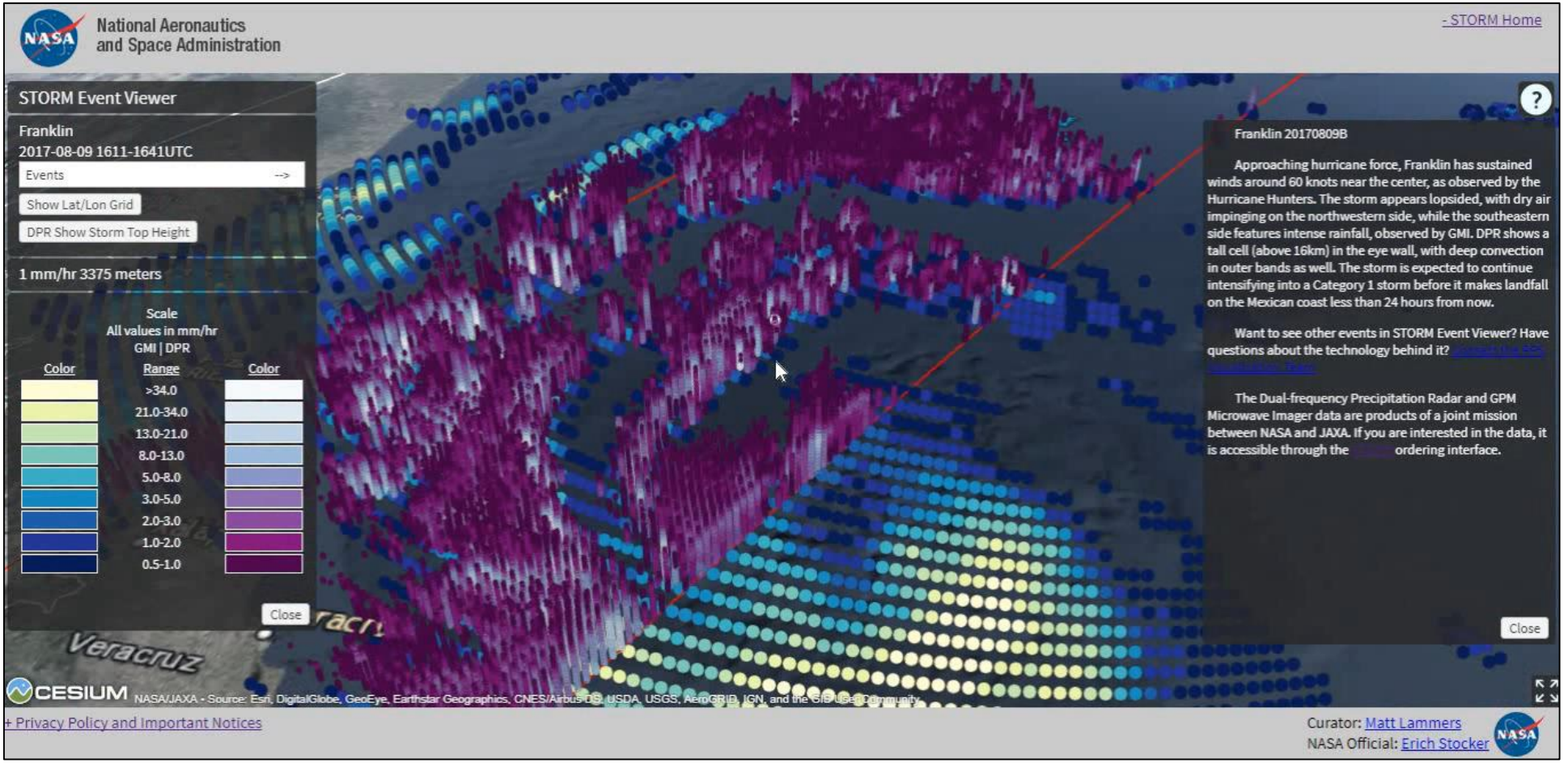
Swath-Based Analysis Tool + Virtual Globe



Putting Them Together

https://pmm.nasa.gov/storm-viewer/EventViewer.html

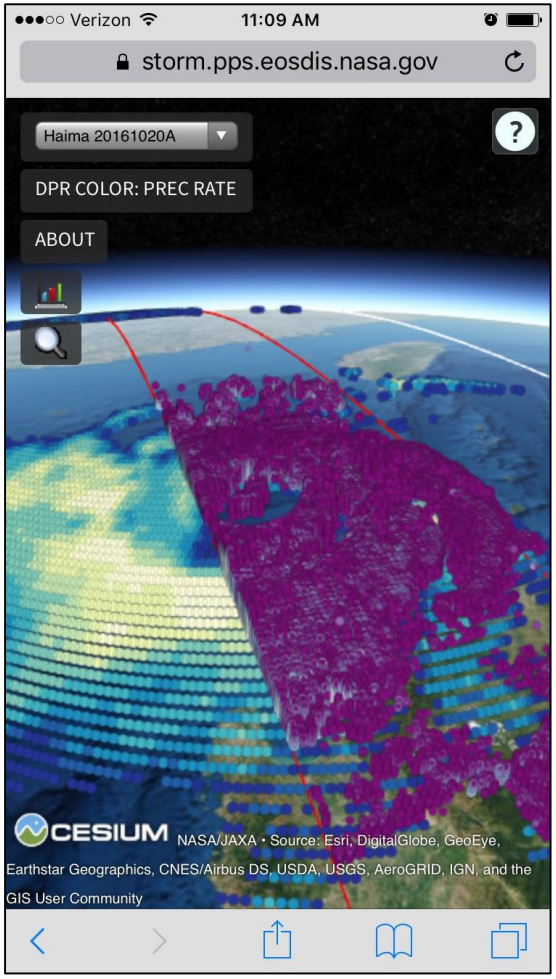
Event Viewer

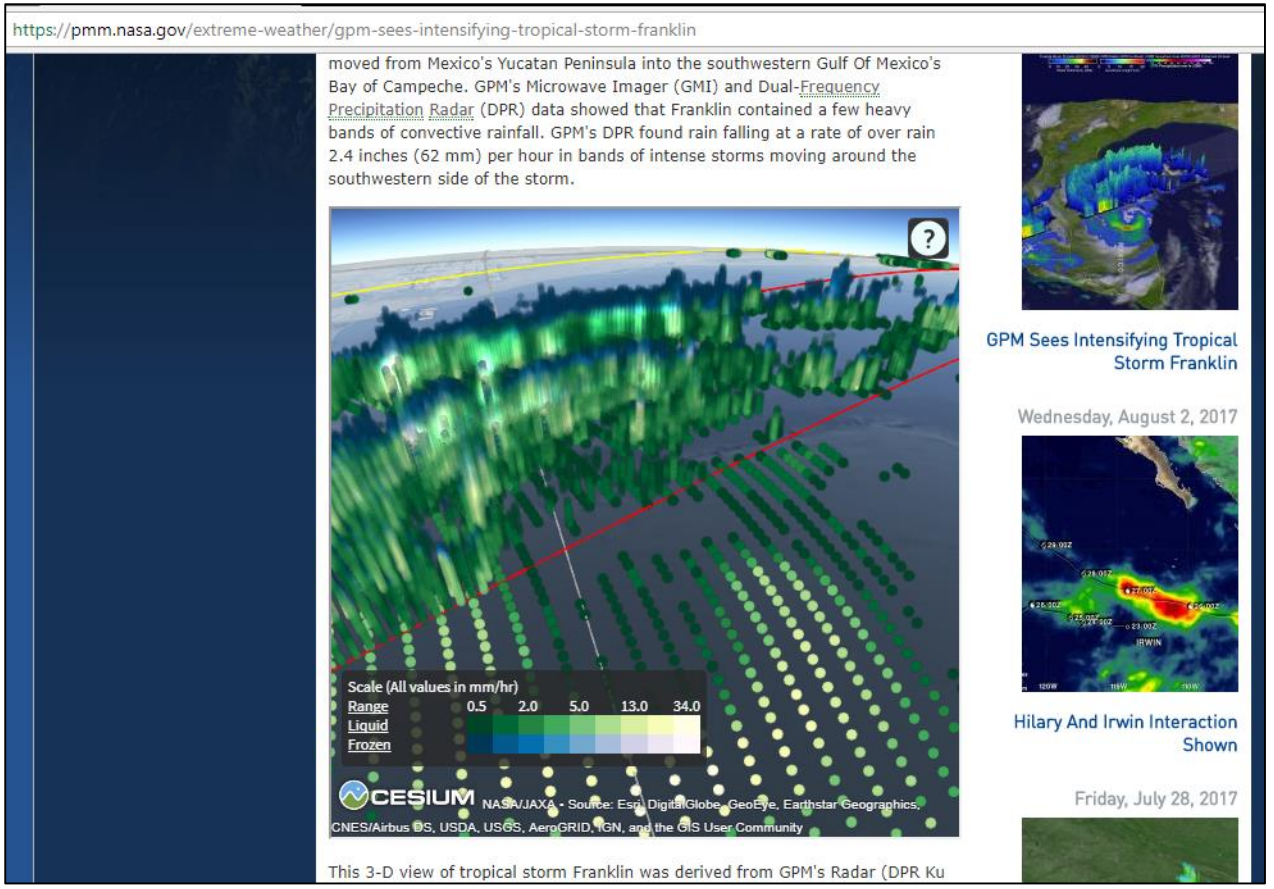


Putting Them Together

https://pmm.nasa.gov/storm-viewer/EVMini.html

EV Mini/EV Micro

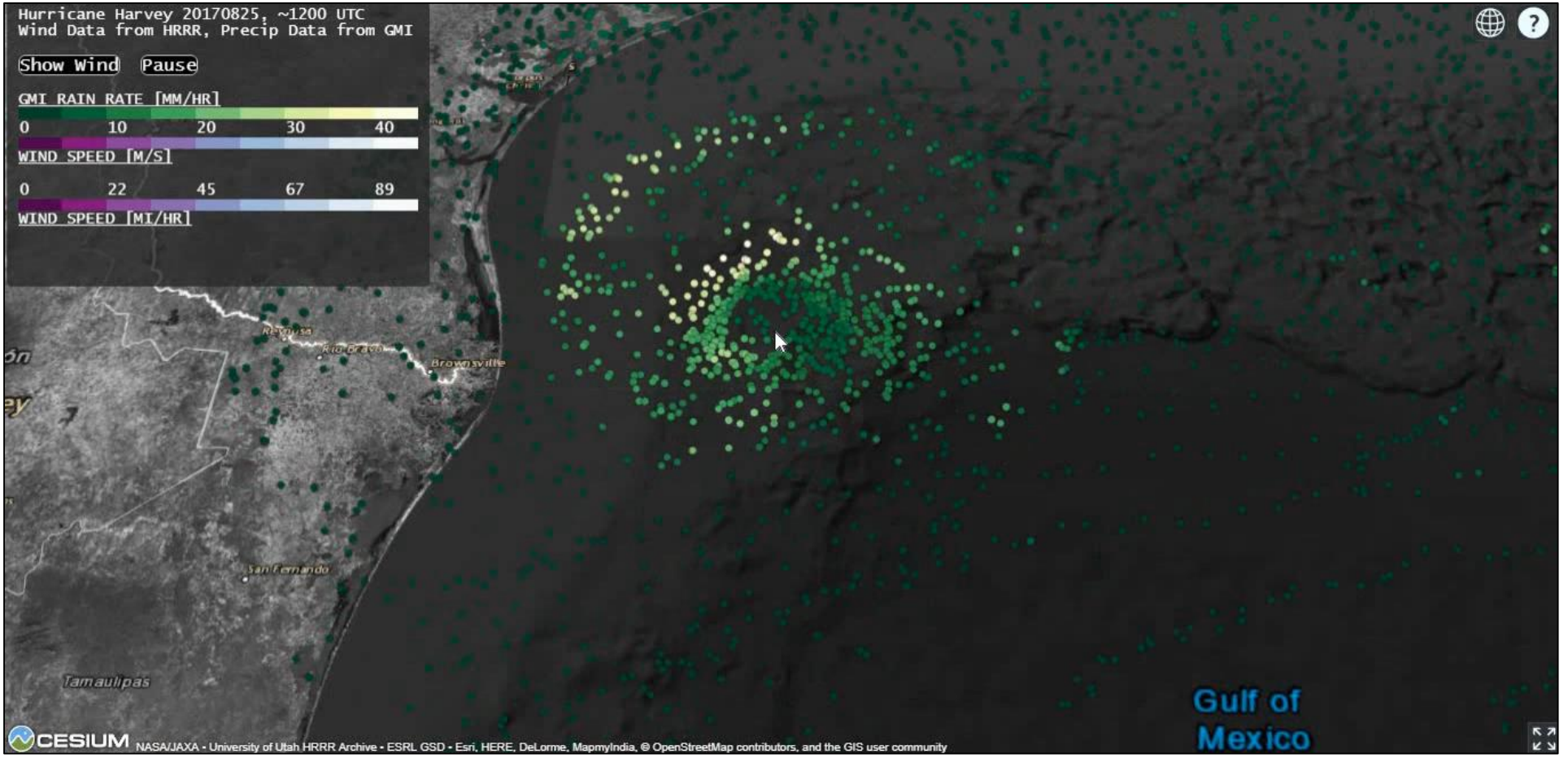




Putting Them Together

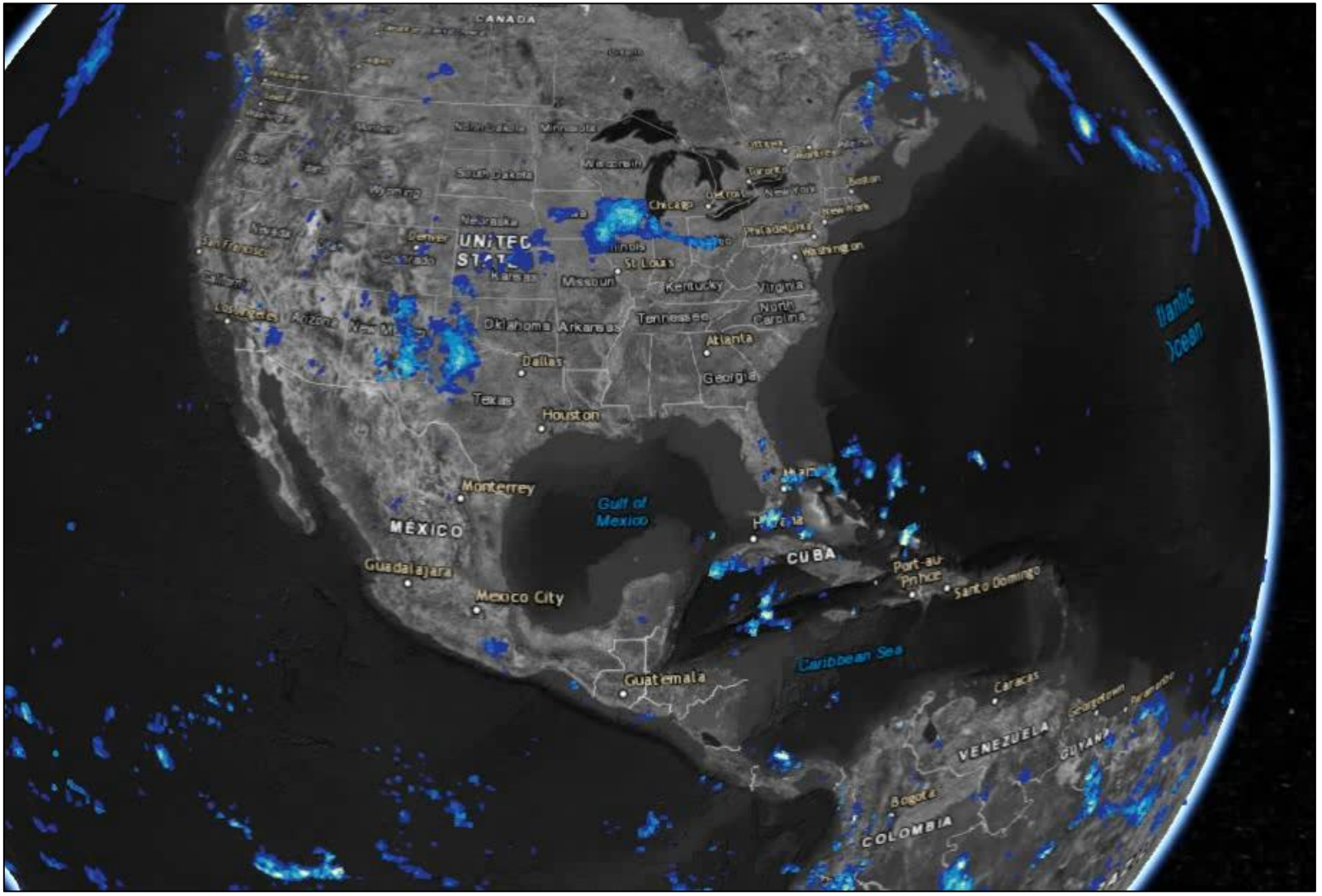
https://storm.pps.eosdis.nasa.gov/storm/cesium/Spiral.html

GMI/HRRR Spiral



Putting Them Together

IMERG Time Lapse (Point Clouds)



Conclusion

- We have tons of precipitation-related satellite products from the last two decades
- Even if you don't use precipitation information, think about how your data can be made more interactive and displayed more fully using new technologies like CesiumJS
- Happy to discuss technical details rest of week

Questions?

matthew.r.lammers@nasa.gov

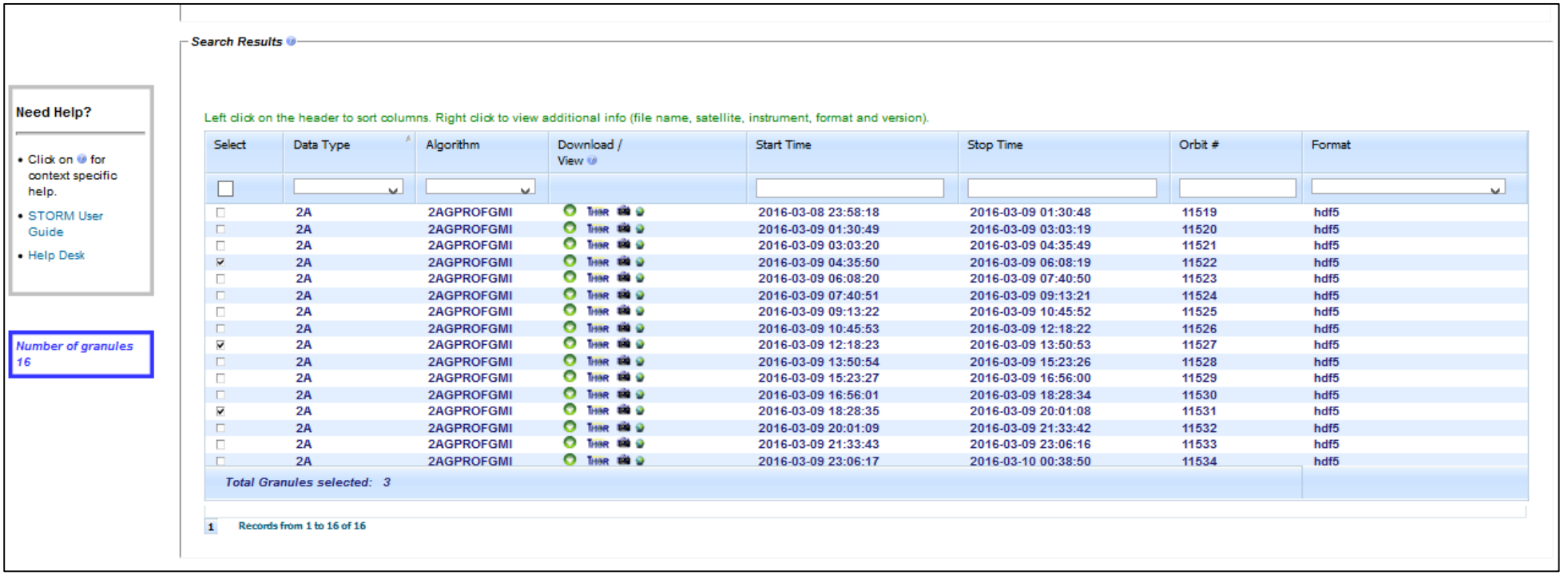
https://storm.pps.eosdis.nasa.gov

https://cesiumjs.org

Extra Slides…

Acquiring GPM Files

https://storm.pps.eosdis.nasa.gov



Search Results

Need Help?

- Click on for context specific help.
- STORM User Guide
- Help Desk

Number of granules 16

Left click on the header to sort columns. Right click to view additional info (file name, satellite, instrument, format and version).

Select	Data Type	Algorithm	Download / View	Start Time	Stop Time	Orbit #	Format
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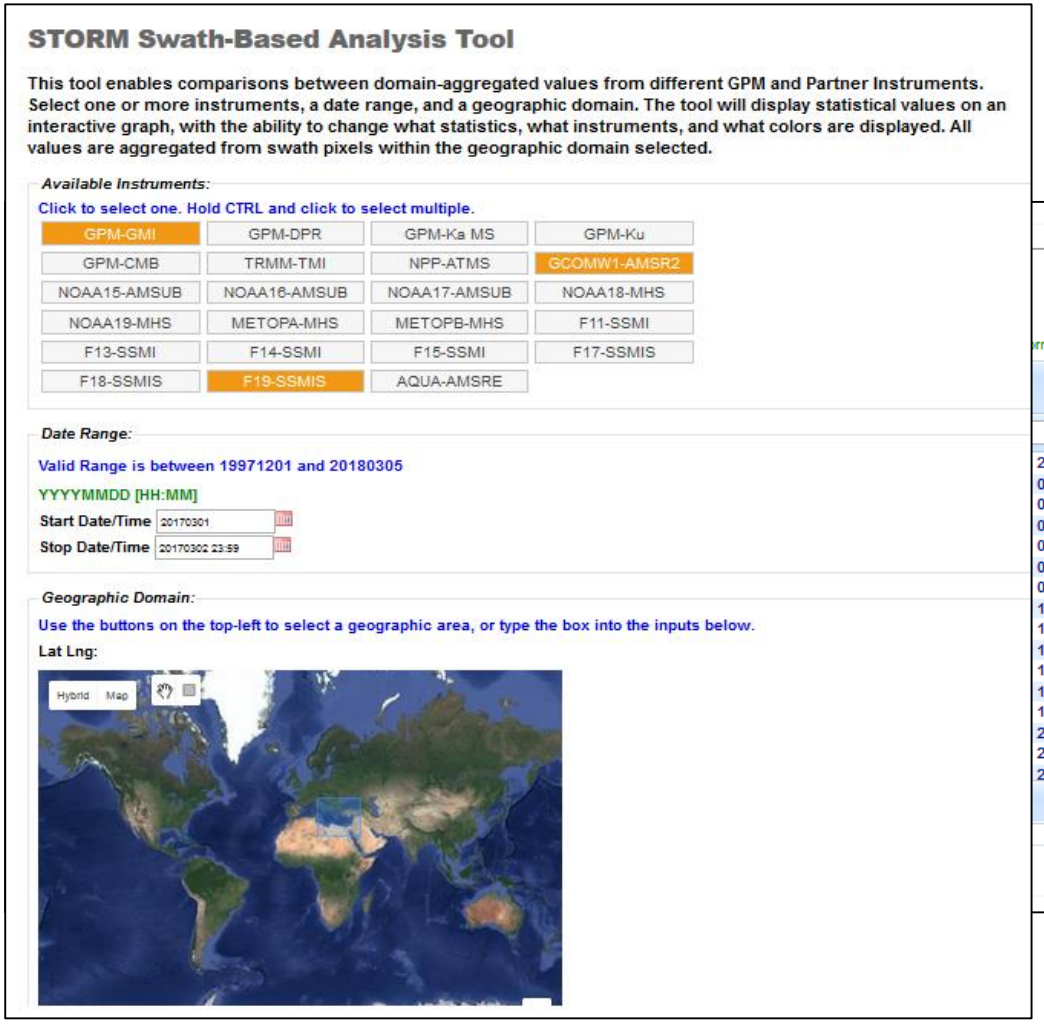
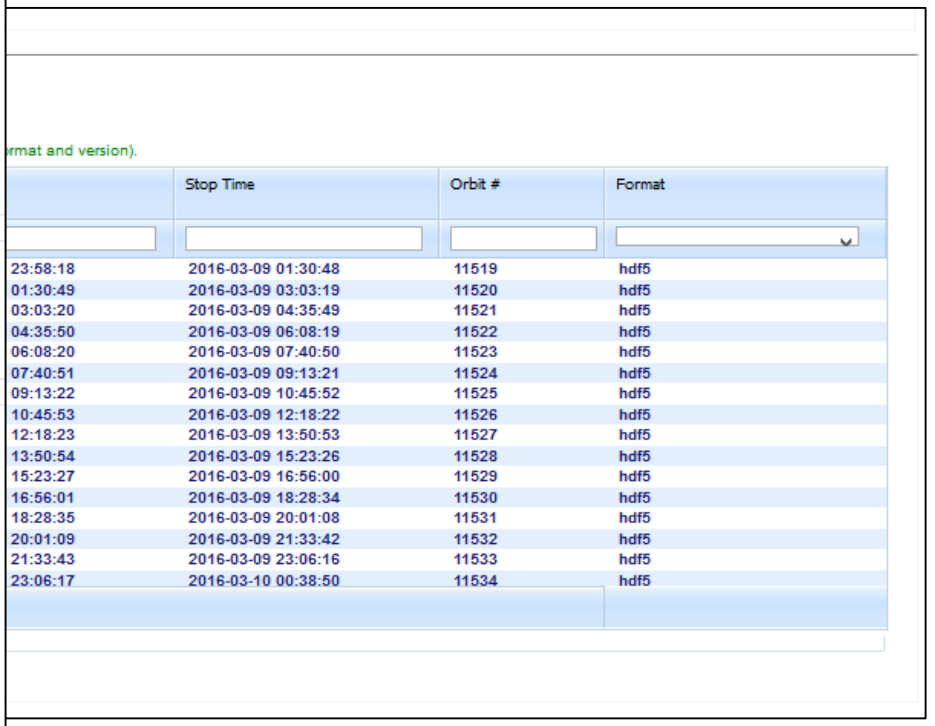
Acquiring GPM Files

https://storm.pps.eosdis.nasa.gov





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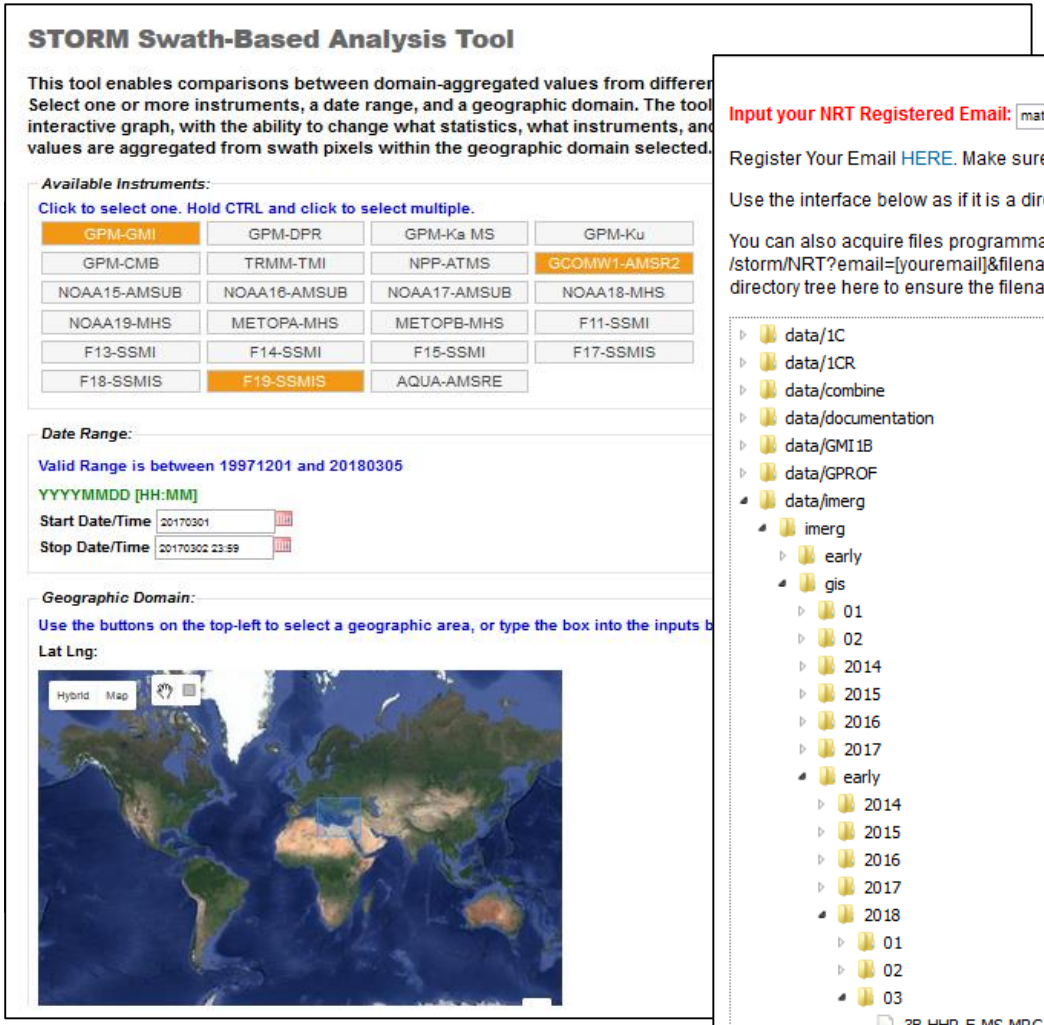

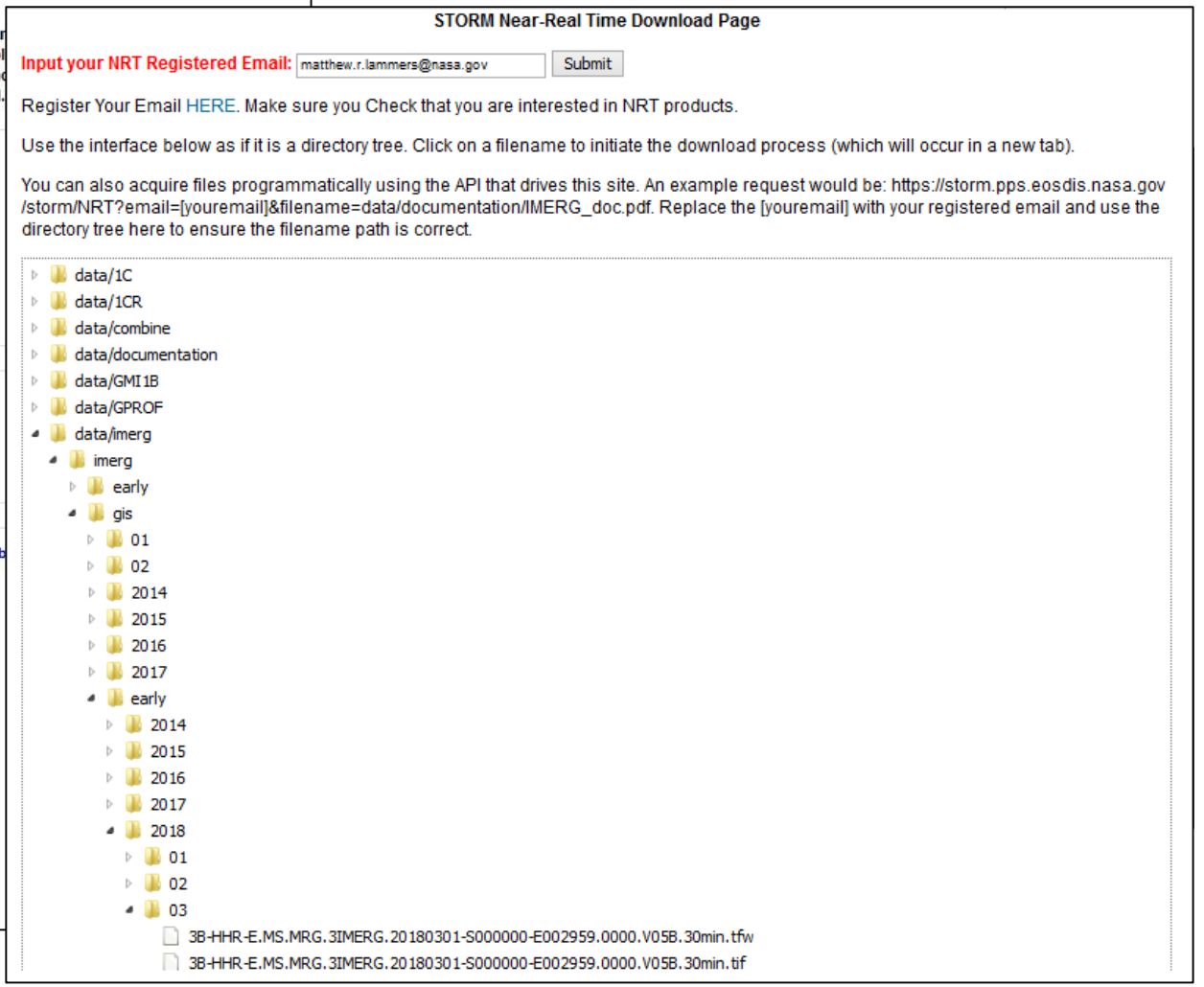
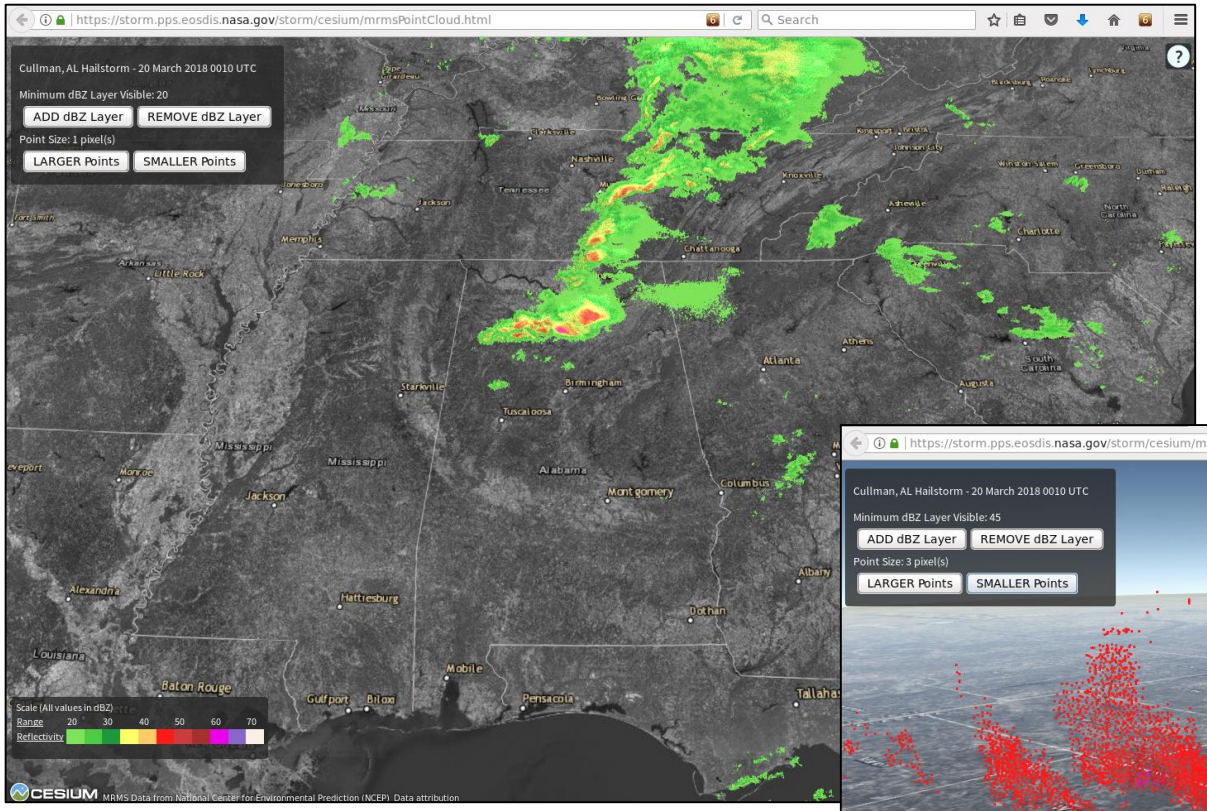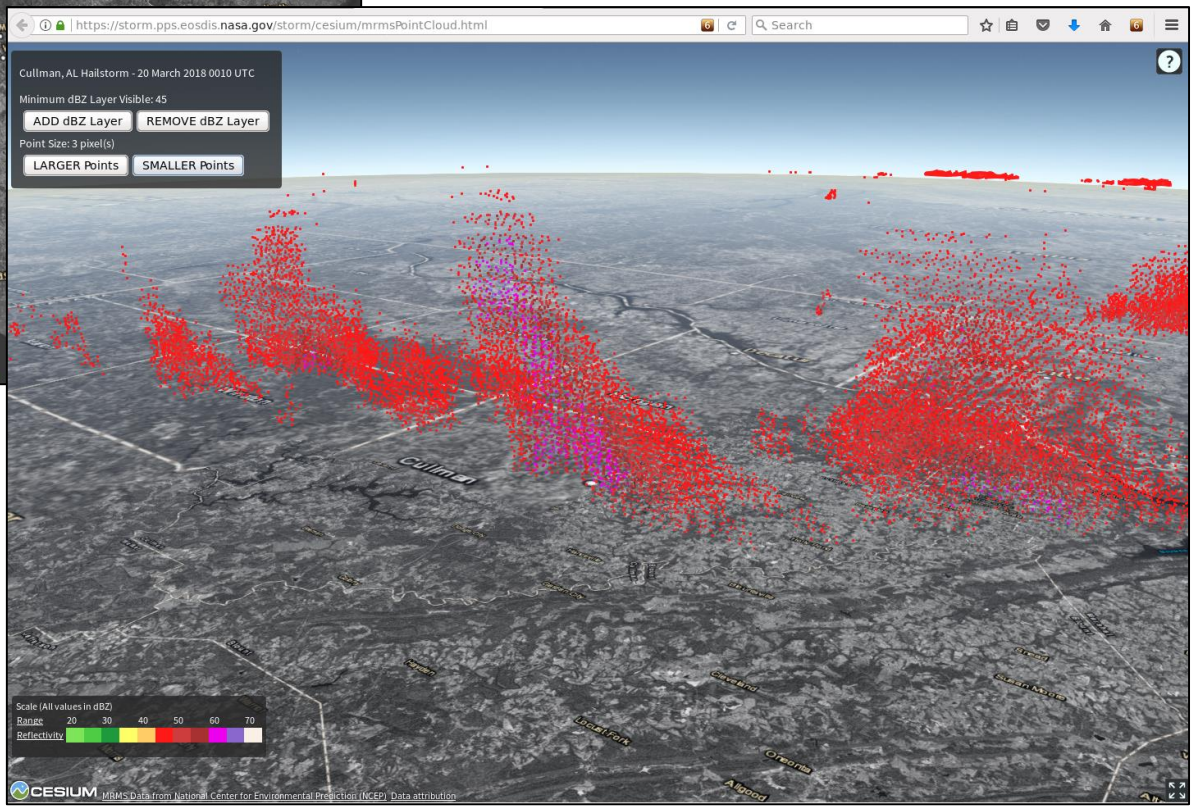
Point Clouds